In th Claim

Please replace the claims with the following clean version of the entire set of pending claims, in accordance with 37 CFR § 1.121(c)(1)(i). Cancel all previous versions of any pending claim.

A marked-up version showing amendments to any claims being changed is provided in one or more accompanying pages separate from this amendment in accordance with 37 CFR § 1.121(c)(1)(ii). Any claim not accompanied by a marked-up version has not been changed relative to the immediate prior version, except that marked-up versions are not being supplied for any added claim or canceled claim.

CLAIMS

1. (Amended) A method of forming integrated circuitry comprising:

forming a silicon nitride comprising layer over a semiconductor substrate; and

etching at least a portion of the silicon nitride comprising layer using an etching chemistry consisting essentially of reactive components of ammonia and at least one fluorocarbon.

2. The method of claim 1 wherein the silicon nitride comprising layer consists essentially of silicon nitride.

3. The method of claim 1 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 2:1.

4. The method of claim 1 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of no less than 4:1.

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5. The method of claim 1 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of no less than 6:1.

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6. (Amended) A method of forming integrated circuitry comprising:

forming a silicon nitride comprising layer over a semiconductor substrate; and

etching at least a portion of the silicon nitride comprising layer using an etching chemistry comprising ammonia and at least one fluorocarbon, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of no less than 9:1.

7. (Amended) The method of claim 6 wh rein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of at least 20:1.

8. The method of claim 1 wherein the etching comprises plasma etching.

9. The method of claim 1 wherein the etching comprises magnetically enhanced plasma etching.

10. The method of claim 1 wherein the etching comprises substantially anisotropic etching of the silicon nitride comprising layer.

11. The method of claim 1 wherein the fluorocarbon comprises a hydrofluorocarbon.

12. (Amended) A method of forming integrated circuitry comprising:

forming a silicon nitride comprising layer over a semiconductor substrate; and

etching at least a portion of the silicon nitride comprising layer using an etching chemistry comprising ammonia and at least one fluorocarbon, wherein the fluorocarbon is at least one member selected from the group consisting of C_4F_6 and C_5F_8.

Cancel claim 13.

14. The method of claim 1 wherein the etching chemistry comprises at least two fluorocarbons.

15. The method of claim 1 wherein the etching chemistry comprises at least three fluorocarbons.

SUB B2

16. (Amended) A method of forming integrated circuitry comprising:

forming a layer comprising silicon nitride over a semiconductor substrate;

forming a patterned photoresist comprising masking layer over the silicon nitride layer, the patterned masking layer comprising mask openings therethrough; and

plasma etching the silicon nitride comprising layer through the mask openings substantially selectively to the photoresist comprising layer using an etching chemistry consisting essentially of reactive components of ammonia and at least one fluorocarbon under etching conditions effective to substantially anisotropically etch the silicon nitride comprising layer, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 3:1 and providing increased selectivity to the photoresist comprising masking layer than would otherwise occur using identical etching chemistry and identical etching conditions without any ammonia.

B2 cont

17. The method of claim 16 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of no less than 6:1.

18. (Amended) A method of forming integrated circuitry comprising:

forming a layer comprising silicon nitride over a semiconductor substrate;

forming a patterned photoresist comprising masking layer over the silicon nitride layer, the patterned masking layer comprising mask openings therethrough; and

plasma etching the silicon nitride comprising layer through the mask openings substantially selectively to the photoresist comprising layer using an etching chemistry comprising ammonia and at least one fluorocarbon under etching conditions effective to substantially anisotropically etch the silicon nitride comprising layer, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 3:1 and providing increased selectivity to the photoresist comprising masking layer than would otherwise occur using identical etching chemistry and identical etching conditions without any ammonia, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of no less than 9:1.

19. The method of claim 16 wherein the fluorocarbon comprises a hydrofluorocarbon.

SUB B3

20. (Amended) A method of forming integrated circuitry comprising:

forming a layer comprising silicon nitride over a semiconductor substrate;

forming a patterned photoresist comprising masking layer over the silicon nitride layer, the patterned masking layer comprising mask openings therethrough; and

plasma etching the silicon nitride comprising layer through the mask openings substantially selectively to the photoresist comprising layer using an etching chemistry comprising ammonia and at least one fluorocarbon under etching conditions effective to substantially anisotropically etch the silicon nitride comprising layer, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 3:1 and providing increased selectivity to the photoresist comprising masking layer than would otherwise occur using identical etching chemistry and identical etching conditions without any ammonia, wherein the fluorocarbon is at least one member selected from the group consisting of C_4F_6 and C_5F_8.

21. The method of claim 16 wherein the silicon nitride comprising layer consists essentially of silicon nitride.

22. (Amended) A method of forming shallow trench isolation in a semiconductor substrate, comprising:

depositing a silicon nitride comprising layer over a bulk semiconductor substrate;

depositing a photoresist comprising masking layer over the silicon nitride comprising layer;

patterning the photoresist comprising masking layer effective to form a plurality of shallow trench mask openings therethrough; and

etching the silicon nitride comprising layer through the mask openings substantially selectively relative to the photoresist using an etching chemistry consisting essentially of reactive components of ammonia and at least one fluorocarbon.

23. The method of claim 22 wherein the silicon nitride comprising layer consists essentially of silicon nitride.

24. The method of claim 22 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 2:1.

25. The method of claim 22 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of no less than 4:1.

26. The method of claim 22 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of no less than 6:1.

27. (Amended) A method of forming shallow trench isolation in a semiconductor substrate, comprising:

depositing a silicon nitride comprising layer over a bulk semiconductor substrate;

depositing a photoresist comprising masking layer over the silicon nitride comprising layer;

patterning the photoresist comprising masking layer effective to form a plurality of shallow trench mask openings therethrough; and

etching the silicon nitride comprising layer through the mask openings substantially selectively relative to the photoresist using an etching chemistry comprising ammonia and at least one fluorocarbon, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of no less than 9:1.

28. The method of claim 27 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of at least 20:1.

29. The method of claim 22 wherein the etching comprises plasma etching.

30. The method of claim 22 wherein the etching comprises magnetically enhanced plasma etching.

31. The method of claim 22 wherein the etching comprises substantially anisotropic etching of the silicon nitride comprising layer.

32. The method of claim 22 wherein the fluorocarbon comprises a hydrofluorocarbon.

33. (Amended) A method of forming shallow trench isolation in a semiconductor substrate, comprising:

depositing a silicon nitride comprising layer over a bulk semiconductor substrate;

depositing a photoresist comprising masking layer over the silicon nitride comprising layer;

patterning the photoresist comprising masking layer effective to form a plurality of shallow trench mask openings therethrough; and

etching the silicon nitride comprising layer through the mask openings substantially selectively relative to the photoresist using an etching chemistry comprising ammonia and at least one fluorocarbon, wherein the fluorocarbon is at least one member selected from the group consisting of C_4F_6 and C_5F_8.

Cancel claim 34.

35. The method of claim 33 wherein the etching chemistry comprises at least two fluorocarbons.

36. The method of claim 33 wherein the etching chemistry comprises at least three fluorocarbons.

37. (Amended) A method of forming shallow trench isolation in a semiconductor substrate, comprising:

depositing a silicon nitride comprising layer over a bulk semiconductor substrate;

depositing a photoresist comprising masking layer on the silicon nitride comprising layer;

patterning the photoresist comprising masking layer effective to form a plurality of shallow trench mask openings therethrough to the silicon nitride comprising layer; and

plasma etching the silicon nitride comprising layer through the mask openings substantially selectively to the photoresist comprising layer using an etching chemistry consisting essentially of reactive components of ammonia and at least one fluorocarbon under etching conditions effective to substantially anisotropically etch the silicon nitride comprising layer, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 3:1.

38. The method of claim 37 wherein the etching conditions and ammonia quantity are effective to provide increased selectivity to the photoresist comprising masking layer than would otherwise occur using identical etching chemistry and identical etching conditions without any ammonia.

39. The method of claim 37 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of no less than 6:1.

40. (Amended) A method of forming shallow trench isolation in a semiconductor substrate, comprising:

depositing a silicon nitride comprising layer over a bulk semiconductor substrate;

depositing a photoresist comprising masking layer on the silicon nitride comprising layer;

patterning the photoresist comprising masking layer effective to form a plurality of shallow trench mask openings therethrough to the silicon nitride comprising layer; and

plasma etching the silicon nitride comprising layer through the mask openings substantially selectively to the photoresist comprising layer using an etching chemistry comprising ammonia and at least one fluorocarbon under etching conditions effective to substantially anisotropically etch the silicon nitride comprising layer, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 3:1, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of no less than 9:1.

41. The method of claim 37 wherein the fluorocarbon comprises a hydrofluorocarbon.

42. (Amended) A method of forming shallow trench isolation in a semiconductor substrate, comprising:

depositing a silicon nitride comprising layer over a bulk semiconductor substrate;

depositing a photoresist comprising masking layer on the silicon nitride comprising layer;

patterning the photoresist comprising masking layer effective to form a plurality of shallow trench mask openings therethrough to the silicon nitride comprising layer; and

plasma etching the silicon nitride comprising layer through the mask openings substantially selectively to the photoresist comprising layer using an etching chemistry comprising ammonia and at least one fluorocarbon under etching conditions effective to substantially anisotropically etch the silicon nitride comprising layer, the etching chemistry comprising a volumetric ratio of all fluorocarbon to the ammonia of from 40:1 to 3:1, wherein the fluorocarbon is at least one member selected from the group consisting of C_4F_6 and C_5F_8.

43. Th method of claim 37 wherein the silicon nitride comprising layer consists essentially of silicon nitride.

New Claims

Add new claims 44 and 45 as follows:

44. (Added) The method of claim 18 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of at least 20:1.

45. (Added) The method of claim 40 wherein the etching chemistry comprises a volumetric ratio of all fluorocarbon to the ammonia of at least 20:1.